

DR. CHARLES P. MALONE

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Education:

- Ph.D., Physics, October 2003, University of Windsor, Windsor ON, Canada
 - Thesis: Electron-Cluster Interactions—excitation of neutral fragments in rare gases and simple molecules
- B.Sc.(honors), Physics, June 1999, University of Windsor, Windsor ON, Canada
 - Graduated with First Class Honors in Physics with a Minor in Mathematics

Professional Experience:

- *Research Associate:* Advanced Instrumentation and Spectroscopy Group, Planetary and Life Detection Sciences Section, Science Division, Jet Propulsion Laboratory, California Institute of Technology, (2004-Present)
 - California State University, Fullerton, ASC contractor at JPL (2007-present)
 - NASA Postdoctoral Fellow at JPL (2006-2007)
 - National Academy of Sciences/National Research Council Postdoctoral Research Associate at JPL (2004-2005)
- *Professor:* part-time faculty, California State University, Fullerton (2008-present)
- *Teaching Assistant:* University of Windsor (1999-2003)

Research Interests:

- Electron impact induced emission spectroscopy, electron energy loss spectroscopy, and time-of-flight (metastable) spectroscopy involving atomic and molecular species relevant to planetary atmospheres and astrophysical environments, radiation damage in biological materials, and to environmental pollution.
- Electron-cluster interactions involving excitation of neutral fragments in rare gases and simple molecules such as water.

Awards:

- NASA, Postdoctoral Fellowship Award (2006-2007). *International award.*
- National Research Council, Resident Research Fellowship Award (2004-2005). *International award.*
- Natural Sciences and Engineering Research Council (NSERC) of Canada Post Graduate Scholarship (2000-2003). *National award.*
- University of Windsor Post Graduate Scholarship (1999-2003). *University award.*

- Natural Sciences and Engineering Research Council (NSERC) of Canada Summer Research Award (1998). *National award*.
- University of Windsor, Nicholas Copernicus Scholarship in Physics (1996-1999). *University award: awarded annually to the top two to three undergraduate physics students*.

Teaching Experience:

- Professor, Part-time Faculty, Physics Department, California State University, Fullerton (2008-present)
 - Performed all standard, full-duty teaching activities for the following courses:
Elementary Physics: [Phys-211/L] responsible for all lecturing, planning, and administrative roles. Lectured introductory physics topics (3 hour class), graded assignments and laboratory reports, provided office hours, and supervised laboratory experiments for science students (non-physics majors).
Electricity & Magnetism: [Phys-330] Guest Lecturer (see Professional Activities) for physics majors. Lectured for a 2.5 hour class and performed all lesson planning.
- Teaching Assistant, University of Windsor, Canada (1999-2003)
 - Assisted with various undergraduate physics courses (*see the following*), involving the preparation of laboratory equipment, supervising laboratory sessions, instruction of physical and mathematical concepts for problem solving and data analysis (including use of Maple software), providing office hours, supervising tests and exams, and grading laboratory reports, assignments, and examinations.
Introductory Physics: graded assignments and laboratory reports, provided office hours, supervised mid-terms and final exams, and supervised laboratory experiments (including some lecturing) for first year science students.
Introduction to Theoretical Methods: supervised computer lab exercises (including some lecturing) with emphasis on utilization of Maple software, provided office hours, and supervised tests and the final exam (both written and computer based) for a first year course for physics majors.
Introduction to Astronomy: supervised and graded the mid-term and final exam for a first year general astronomy course designed for non-science students.
Introduction to Electromagnetism: graded assignments and supervised tests and exams for a second year E&M course for physics and engineering students.
Classical Mechanics: graded assignments for a third year mechanics course for physics majors.
Quantum Physics and Chemistry: graded assignments and provided office hours for a third year modern physics course for physics majors.
- Tutor/Grader, Windsor, Canada (1996-1999)
 - Graded high school physics and mathematics tests and final exams.
 - Tutored students in the first year introductory physics course (calculus based) as part of the Tutor Link program organized by the University of Windsor.

Professional Activities:

- Guest Lecturer: contributor in the “Professor for a Day” program at CSU Fullerton (3/18/2008), taught Electricity & Magnetism course (Phys-330) for physics majors and engaged the students by discussing NASA related research and career opportunities
- Reviewer: NASA, Planetary Atmospheres Program (2007), assisted chair Dr. Kanik

- Reviewer: National Science Foundation, ATM–Aeronomy (2007), co-reviewer with Dr. Johnson
- Referee: Journal of Physics B: Atomic, Molecular, and Optical Physics (2005-present)
- Member of Tenure Review Committee (Physics), University of Windsor (2002-2003)
 - Adjudicated two faculty positions
- Senior Judge, Windsor Regional Secondary School Science Fair (Spring, 2002)
- Member of General Appointments Committee (Physics), University of Windsor (1999-2003)
 - Adjudicated four faculty positions
- Graduate Representative (Physics), University of Windsor (1999-2003)
 - Chair of student meetings
- Member of Physics and High Technology Program Development Committee (Physics), University of Windsor (1998-2000)
- Member of Executive Council (School of Physical Sciences), University of Windsor (1998-1999)
- Undergraduate Representative (Physics), University of Windsor (1998-1999)

Professional Memberships:

- American Physical Society (APS)
- Canadian Association of Physicists (CAP)
- American Geophysical Union (AGU)

Research Grants:

- NASA Outer Planets Research Program: *Electron Impact Studies of Molecular Nitrogen Relevant to the Atmospheres of Titan and Triton*, Contributing[†] Role: **Postdoctoral Associate**[§]; Total Budget: \$297.8k, Awarded December 2005, Duration: 3 years.
- NASA Planetary Atmospheres Program: *Electron-Impact Cross Sections for Models of Ultraviolet Observations of the Outer Planets by Cassini and Hubble Space Telescope (HST)*, Contributing[†] Role: **Co-Investigator (submitted as PA[§])**; Total Budget: \$410.1k, Awarded September 2007, Duration: 3 years.
- NASA Planetary Atmospheres Program: *Predissociation Yields and Electron Impact Cross Sections Relevant to Nitrogen-Rich Atmospheres*, Contributing[†] Role: **Co-Investigator**; Total Budget: \$412k, Awarded October 2007, Duration: 3 years.

[†] **Note:** Contributed a minimum of 30% to the preparation of the proposals, in addition to the laboratory work.

[§] **Note:** NASA and NAS/NRC Research Associate policies prohibited Co-Investigator status. My functional role is Co-I.

Peer-Reviewed Publications:

- J. M. Ajello, J. Gustin, I. Stewart, K. Larsen, L. Esposito, W. Pryor, W. McClintock, M. H. Stevens, **C. P. Malone**, and D. Dziczek, Titan Airglow Spectra from the Cassini Ultraviolet Imaging Spectrograph: FUV Disk Analysis, *Geophysical Research Letters*, **35**, L06102 (2008), doi:10.1029/2007GL032315.
- X. Liu, D. E. Shemansky, **C. P. Malone**, P. V. Johnson, J. M. Ajello, I. Kanik, A. N. Heays, B. R. Lewis, S. T. Gibson, and G. Stark, Experimental and Coupled-Channels Investigation of the Radiative Properties of the N₂ c' ¹Σ_u⁺ – X ¹Σ_g⁺ Band System, *Journal of Geophysical Research: Space Physics*, **113**, A02304 (2008), doi:10.1029/2007JA012787.

- M. A. Khakoo, **C. P. Malone**, P. V. Johnson, B. R. Lewis, R. Laher, S. Wang, V. Swaminathan, D. Nuyujukian, and I. Kanik, Electron Impact Excitation of X $^1\Sigma_g^+$ ($v''=0$) to the a'' $^1\Sigma_g^+$, b $^1\Pi_u$, c₃ $^1\Pi_u$, o₃ $^1\Pi_u$, b' $^1\Sigma_u^+$, c₄ $^1\Sigma_u^+$, G $^3\Pi_u$, and F $^3\Pi_u$ States of Molecular Nitrogen, *Physical Review A: Atomic, Molecular, and Optical Physics*, **77**, 012704 (2008).
- P. V. Johnson, **C. P. Malone**, M. A. Khakoo, J. W. McConkey, and I. Kanik, Electron Collisions with Constituents of Planetary Atmospheres, *Journal of Physics: Conference Series*, **88**, 012069 (2007).
- M. A. Khakoo, S. Wang, R. Laher, P. V. Johnson, **C. P. Malone**, and I. Kanik, Direct Evidence for Channel-Coupling Effects in Molecules: Electron Impact Excitation of the a'' $^1\Sigma_g^+$ state of N₂, *Journal of Physics B: Atomic, Molecular, and Optical Physics – Fast Track Communication*, **40**, F167-F173 (2007).
- S. Wang, P. V. Johnson, **C. P. Malone**, I. Kanik, and M. A. Khakoo, Transmission Effects in Unfolding Electronic-Vibrational Electron-Molecule Energy Loss Spectra, *Physical Review A: Atomic, Molecular, and Optical Physics*, **73**, 034702 (2006).
- P. V. Johnson, **C. P. Malone**, I. Kanik, and M. A. Khakoo, Integral Cross Sections for the Direct Excitation of the A $^3\Sigma_u^+$, B $^3\Pi_g$, W $^3\Delta_u$, B' $^3\Sigma_u^-$, a' $^1\Sigma_u^-$, a $^1\Pi_g$, w $^1\Delta_u$ and C $^3\Pi_u$ Electronic States in N₂ by Electron Impact, *Journal of Geophysical Research: Space Physics*, **110**, A11311 (2005), doi:10.1029/2005JA011295.
- **C. P. Malone**, W. Kedzierski, and J. W. McConkey, Electron Impact Excitation of Xenon Clusters, *Journal of Physics B: Atomic, Molecular and Optical Physics*, **36**, 3607-3620 (2003).
- **C. Malone**, W. Kedzierski, and J. W. McConkey, Electron Impact Excitation of Krypton Clusters, *The European Physical Journal D: Atomic, Molecular and Optical Physics*, **18**, 87-92 (2002).
- **C. Malone**, W. Kedzierski, and J. W. McConkey, Electron Impact Excitation of N₂O Clusters, *Journal of Physics B: Atomic, Molecular and Optical Physics*, **33**, 4863-4871 (2000).
- W. Kedzierski, **C. Malone**, and J. W. McConkey, Dissociative Excitation of SO₂ by Electron Impact, *Canadian Journal of Physics*, **78**, 617-624 (2000); *ibid*, 1113-1114 (2000).
- W. Kedzierski, J. Derbyshire, **C. Malone**, and J. W. McConkey, Isotope Effects in the Electron Impact Break-Up of Water, *Journal of Physics B: Atomic, Molecular and Optical Physics*, **31**, 5361-5368 (1998).

Accepted Papers:

- **C. P. Malone**, P. V. Johnson, J. W. McConkey, J. M. Ajello, and I. Kanik, Dissociative Excitation of N₂O by Electron Impact, *Journal of Physics B: Atomic, Molecular and Optical Physics*, **41**, in press (2008).
- J. W. McConkey, **C. P. Malone**, P. V. Johnson, I. Kanik, C. E. Winstead, and V. McKoy, Electron Impact Dissociation of Oxygen-Containing Molecules — A Critical Review, *Physics Reports*, in press (2008).
- **C. P. Malone**, P. V. Johnson, J. W. McConkey, and I. Kanik, Cross Sections for the O II (83.4 nm) Emission from Electron Impact on O₂, submitted to *Journal of Geophysical Research: Space Physics*, **113**, in press (2008), doi:10.1029/2008JA013160.

Papers in Preparation:

- **C. P. Malone**, P. V. Johnson, I. Kanik, and M. A. Khakoo, Integral Cross Sections for the Electron Impact Excitation of the $a'' \ ^1\Sigma_g^+$, $b \ ^1\Pi_u$, $c_3 \ ^1\Pi_u$, $o_3 \ ^1\Pi_u$, $b' \ ^1\Sigma_u^+$, $c'_4 \ ^1\Sigma_u^+$, $G \ ^3\Pi_u$, and $F \ ^3\Pi_u$ States of N_2 , to be submitted to *Journal of Chemical Physics*, 2008.
- **C. P. Malone**, P. V. Johnson, J. M. Ajello, and I. Kanik, Electron Impact Induced Emission Cross Sections of the Lyman-Birge-Hopfield Band System in N_2 ($a \ ^1\Pi_g \rightarrow X \ ^1\Sigma_g^+$), to be submitted to *Journal of Geophysical Research*, 2008.
- P. V. Johnson, **C. P. Malone**, J. W. McConkey, M. A. Khakoo, I. Čadež, and I. Kanik, Electron interactions with vibrationally excited H_2 , to be submitted to *Physical Review A*, 2008.

Invited Talks:

- Electron Impact Emission and Integral Cross Sections of Gases Relevant to Planetary Atmospheres, National Research Council Research Associateship Programs JPL Site Visit, Jet Propulsion Laboratory, Pasadena, CA, April 28, 2005.

Conference Abstracts:

- **C. P. Malone**, P. V. Johnson, J. W. McConkey, J. M. Ajello, and I. Kanik, Excitation Probabilities and Pathways in e- N_2O Collisions, *39th Annual Meeting of the Division of Atomic, Molecular, and Optical Physics (DAMOP) of the American Physical Society (APS)*, May 27-31, 2008, State College, Pennsylvania, USA. (*Bulletin of the APS*, **53** (9), Abstract xxxx, 2008).
- P. V. Johnson, **C. P. Malone**, M. A. Khakoo, K. Keane, J. Muse, and I. Kanik, Electron Impact Excitation of Molecular Nitrogen, *2007 American Geophysical Union (AGU) Fall Meeting*, December 10-14, 2007, San Francisco, California, USA. (*Eos Trans. AGU*, **88** (52), Fall Meet. Suppl., Abstract SA41A.0259, 2007).
- J. M. Ajello, J. Gustin, M. Stevens, I. Stewart, K. Larsen, L. Esposito, J. Colwell, W. McClintock, W. Pryor, **C. P. Malone**, and G. Holsclaw, Titan Airglow Spectra from Cassini UVIS, *2007 American Geophysical Union (AGU) Fall Meeting*, December 10-14, 2007, San Francisco, California, USA. (*Eos Trans. AGU*, **88** (52), Fall Meet. Suppl., Abstract P21D.05, 2007).
- J. M. Ajello, R. S. Mangina, **C. P. Malone**, P. V. Johnson, M. Stevens, L. Esposito, H. Abgrall, and E. Roueff, UV Emission Processes in Planetary Atmospheres by Electron Impact: Titan UVIS Airglow Observations, *The NASA Workshop on Planetary Atmospheres*, November 6-7, 2007, Greenbelt, Maryland.
- **C. P. Malone**, P. V. Johnson, J. W. McConkey, J. M. Ajello, and I. Kanik, Electron Impact Excitation of Atmospheric Species, *60th Gaseous Electronics Conference (GEC)*, October 2-5, 2007, Arlington, Virginia. (*Bulletin of the APS*, **52** (9), Abstract MWP1.33, 2007).
- **C. P. Malone**, P. V. Johnson, I. Kanik, S. Wang, and M. A. Khakoo, Integral Cross Sections for the Electron Impact Excitation of Molecular Nitrogen, *60th Gaseous Electronics Conference (GEC)*, October 2-5, 2007, Arlington, Virginia. (*Bulletin of the APS*, **52** (9), Abstract MWP1.34, 2007).
- **C. P. Malone**, P. V. Johnson, J. W. McConkey, J. M. Ajello, and I. Kanik, Dissociative Excitation of N_2O in the VUV Spectral Region, *XXV International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC)*, July 25-31, 2007, Freiburg, Germany. (Abstract Fr118).

- P. V. Johnson, **C. P. Malone**, M. A. Khakoo, J. W. McConkey, and I. Kanik, Electron Collisions with vibrationally excited H₂, *XXV International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC)*, July 25-31, 2007, Freiburg, Germany. (Abstract Fr093).
- **C. P. Malone**, P. V. Johnson, M. A. Khakoo, and I. Kanik, Integral Cross Sections for the Electron Impact Excitation of Molecular Nitrogen, *XXV International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC)*, July 25-31, 2007, Freiburg, Germany. (Abstract Fr094).
- **C. P. Malone**, M. A. Khakoo, S. Wang, P. V. Johnson, and I. Kanik, Differential Cross Sections for the a'' $^1\Sigma_g^+$ State of Molecular Nitrogen, *XXV International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC)*, July 25-31, 2007, Freiburg, Germany. (Abstract Fr096).
- M. A. Khakoo, S. Wang, P. V. Johnson, **C. P. Malone**, and I. Kanik, Differential Cross Sections for the Electron Impact Excitation of Several Dipole-Allowed States of Molecular Nitrogen, *XXV International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC)*, July 25-31, 2007, Freiburg, Germany. (Abstract Fr095).
- **C. P. Malone**, P. V. Johnson, J. W. McConkey, J. M. Ajello, and I. Kanik, Electron Impact Induced VUV Emissions from Nitrous Oxide, *38th Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP) of the American Physical Society (APS) Joint with the Division of Atomic and Molecular Physics and Photonic Interactions (DAMPhi) of the Canadian Association of Physicists (CAP)*, June 5-9, 2007, Calgary, Alberta, Canada. (*Bulletin of the APS*, **52** (7), Abstract Q3.04, 2007).
- M. A. Khakoo, S. Wang, P. V. Johnson, **C. P. Malone**, and I. Kanik, Differential Cross Sections for the Electron Impact Excitation of Molecular Nitrogen, *38th Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP) of the American Physical Society (APS) Joint with the Division of Atomic and Molecular Physics and Photonic Interactions (DAMPhi) of the Canadian Association of Physicists (CAP)*, June 5-9, 2007, Calgary, Alberta, Canada. (*Bulletin of the APS*, **52** (7), Abstract R1.98, 2007).
- **C. P. Malone**, P. V. Johnson, X. Liu, J. M. Ajello, D. E. Shemansky, and I. Kanik, High Resolution VUV Spectroscopy of Electron Impact Induced Emissions from Molecular Nitrogen, *2006 American Geophysical Union (AGU) Fall Meeting*, December 11-15, 2006, San Francisco, California, USA. (*Eos Trans. AGU*, **87** (52), Fall Meet. Suppl., Abstract SA13B.0278, 2006).
- P. V. Johnson, **C. P. Malone**, M. A. Khakoo, S. Wang, V. Swaminathan, D. Nuyukian, and I. Kanik, Integral Cross Sections for the Electron Impact Excitation of Molecular Nitrogen, *2006 American Geophysical Union (AGU) Fall Meeting*, December 11-15, 2006, San Francisco, California, USA. (*Eos Trans. AGU*, **87** (52), Fall Meet. Suppl., Abstract SA33A.0255, 2006).
- I. Kanik, **C. P. Malone**, P. V. Johnson, J. M. Ajello, and J. W. McConkey, Electron Impact Induced VUV Emissions from Atmospheric Gases, *2006 American Geophysical Union (AGU) Fall Meeting*, December 11-15, 2006, San Francisco, California, USA. (*Eos Trans. AGU*, **87** (52), Fall Meet. Suppl., Abstract SA33A.0256, 2006).
- **C. P. Malone**, P. V. Johnson, J. W. McConkey, M. A. Khakoo, J. M. Ajello, and I. Kanik, Excitation of Atmospheric Species by Electron Impact, *59th Gaseous Electronics Conference (GEC)*, October 10-13, 2006, Columbus, Ohio. (Abstract FPT1.33).

- M. A. Khakoo, S. Wang, **C. P. Malone**, P. V. Johnson, and I. Kanik, Electron Impact Excitation of Molecular Nitrogen, *59th Gaseous Electronics Conference (GEC)*, October 10-13, 2006, Columbus, Ohio. (Abstract FPT1.34).
- **C. P. Malone**, P. V. Johnson, J. W. McConkey, J. M. Ajello, and I. Kanik, Electron Impact Excitation of Atomic Oxygen, *37th Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP) of the American Physical Society (APS)*, May 16-20, 2006, Knoxville, Tennessee, USA. (*Bulletin of the APS*, **51** (3), Abstract O1.23, 2006).
- M. A. Khakoo, S. Wang, V. Swaminathan, D. Nuyujukian, P. V. Johnson, **C. P. Malone**, and I. Kanik, Electron Impact Excitation of Several Rydberg-Valence Series in Molecular Nitrogen, *37th Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP) of the American Physical Society (APS)*, May 16-20, 2006, Knoxville, Tennessee, USA. (*Bulletin of the APS*, **51** (3), Abstract O1.43, 2006).
- P. V. Johnson, **C. P. Malone**, M. A. Khakoo, K. Tran, and I. Kanik, Integral Cross Sections for the Electron Impact Excitation of Molecular Nitrogen, *2005 American Geophysical Union (AGU) Fall Meeting*, December 5-9, 2005, San Francisco, California, USA. (*Eos Trans. AGU*, **86** (52), Fall Meet. Suppl., Abstract SA11A.0212, 2005).
- **C. P. Malone**, P. V. Johnson, J. M. Ajello, and I. Kanik, Emission Cross Sections of the Lyman-Birge-Hopfield Band System in N₂ Induced by Electron Impact Excitation, *2005 American Geophysical Union (AGU) Fall Meeting*, December 5-9, 2005, San Francisco, California, USA. (*Eos Trans. AGU*, **86** (52), Fall Meet. Suppl., Abstract SA11A.0213, 2005).
- **C. P. Malone**, P. V. Johnson, J. M. Ajello, and I. Kanik, Emission Cross Sections of the Lyman-Birge-Hopfield Band System in N₂ Induced by Electron Impact Excitation, *XXIV International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC)*, July 20-26, 2005, Rosario, Argentina. (Abstract Mo053).
- P. V. Johnson, **C. P. Malone**, M. A. Khakoo, K. Tran, and I. Kanik, Integral Cross Sections for the Electron Impact Excitation of Molecular Nitrogen, *XXIV International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC)*, July 20-26, 2005, Rosario, Argentina. (Abstract Mo055).
- **C. P. Malone**, W. Kedzierski, and J. W. McConkey, Electron-Impact Dissociation of Xenon Clusters, *XXIII International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC)*, July 23-29, 2003, Stockholm, Sweden. (Abstract Th161).
- **C. P. Malone**, W. Kedzierski, and J. W. McConkey, Fragmentation of Rare Gas Clusters by Electron Impact, *International Symposium on Atomic Cluster Collisions (ISACC): fission, fusion, electron, ion and photon impact*, July 18-21, 2003, St. Petersburg, Russia.
- **C. P. Malone**, W. Kedzierski, and J. W. McConkey, Fragmentation of Xe Clusters Following Controlled Electron Impact, *34th Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP) of the American Physical Society (APS)*, May 20-24, 2003, Boulder, Colorado, USA. (*Bulletin of the APS*, **48** (3), Abstract J1.177, 2003).
- **C. P. Malone**, W. Kedzierski, and J. W. McConkey, Electron Impact Excitation of Krypton and Xenon Clusters, *Canadian Association of Physicists (CAP) Annual Congress*, June 2-6, 2002, Quebec City, Quebec, Canada.
- **C. Malone**, W. Kedzierski, and J. W. McConkey, Electron-Impact Dissociation of Krypton Clusters, *XXII International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC)*, July 18-24, 2001, Santa Fe, New Mexico, USA. (Abstract p.264).
- **C. Malone**, W. Kedzierski, and J. W. McConkey, Electron Impact Excitation of Krypton Clusters, *32nd Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP)*

*of the American Physical Society (APS) Joint with the Division of Atomic and Molecular Physics (DAMP) of the Canadian Association of Physicists (CAP), May 16-19, 2001, London, Ontario, Canada. (Bulletin of the APS, **46** (3), Abstract M5.028, 2001).*

- **C. Malone**, W. Kedzierski, and J. W. McConkey, Electron Impact Excitation of N₂O Clusters, *31st Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP) of the American Physical Society (APS)*, June 14-17, 2000, Storrs, Connecticut, USA. (*Bulletin of the APS*, **45** (3), Abstract R9.49, 2000).
- **C. Malone**, W. Kedzierski, and J. W. McConkey, Fragmentation of N₂O Clusters Following Electron Impact, *Canadian Association of Physicists (CAP) Annual Congress*, June 4-7, 2000, Toronto, Ontario, Canada.
- **C. Malone**, W. Kedzierski, and J. W. McConkey, O(¹S) Production Following Electron Impact Dissociative Excitation of SO₂, *American Physical Society (APS) Centennial Meeting*, March 20-26, 1999, Atlanta, Georgia, USA. (*Bulletin of the APS*, **44** (3), Abstract RP01.210, 1999).
- W. Kedzierski, **C. Malone**, and J. W. McConkey, Dissociation of SO₂ into Metastable Fragments Following Electron Impact, *XXI International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC)*, July 20-27, 1999, Sendai, Japan. (Abstract p.334).